

What is claimed is:

1. A method of handling voice call between Radio Communication Units (RCUs) of a wireless communication system in an all-IP architecture, wherein said wireless communication system comprises Core Network (CN) consisting of Mobile switch center MSC and Gateway Mobile Switch Center (GMSC), Radio Network Subsystem (RNS) consisting of a plurality of Radio Network Controllers (RNCs), and a plurality of RCUs, said method comprising the following steps:

A)when a first RCU is about to initiate voice call with a second RCU, a first agent address FA will be assigned to a corresponding mobile RCU via the RNC in which the mobile RCU resides;

B)when the first RCU requests to talk to the second RCU, corresponding Media Gateway (MG) assigns a second agent address HA1 to the first RCU and assigns a second agent address HA2 to the second RCU, wherein both HA1 and HA2 are only valid during this call and are applied in mobile IP routing addressing of the all-IP network, and when the call is terminated or dropped, HA1 and HA2 will be released back to the pool of the IP addresses of the corresponding MG;

C)carrying out appropriate resource configuration for corresponding RNC in which said first and second RCUs reside or the corresponding MG;

D)transmitting VoIP data packets between said RNC of the two RCUs or corresponding MG according to said first agent address FA and said second agent addresses HA1 and HA2, thereby implementing voice call between said two RCUs.

2. The method according to claim 1, wherein IP encapsulation will be effected for the transmitted VoIP data packets by means of said first agent address FA, said second agent addresses HA1 and HA2 in Step D, so that tunnels for transmitting said data packets will be established in foreign agents, avoiding need of transmitting an outer IP header in the radio section.

3. The method according to claims 1 or 2, wherein the second agent address HA1 is assigned to the first RCU and the second agent address HA2 is assigned to the second RCU in accordance with the IP addresses distribution status in the pool of the IP addresses of corresponding MG, and the assigned IP addresses can be re-assigned to other RCUs only after being released, and the IP addresses for MG at different locations differ from each other.

4. The method according to claims 1 or 2, wherein said first RCU is a Mobile Station (MS), said second RCU is a PSTN phone, and the RNC in which the MS resides assigns an foreign agent address FA1 to the MS as its first agent address; when the two RCUs start a voice call, the PSTN MG assigns a temporary home agent address HA1 to the MS as its second agent address, and at the same time assigns a temporary IP address HA2 to the PSTN phone as its second agent address; IP encapsulation is performed on the data packets carrying voices from the PSTN MG to the RNC in which the MS resides by means of inner and outer IP headers, and wherein the source and destination addresses of the outer IP header of the data packet are HA2 and FA1, respectively, and the source and destination addresses of the inner IP header of the data packet are HA2 and HA1,

respectively.

5 5. The method according to claims 1 or 2, wherein said first RCU
is a first MS, the second RCU is a second MS, and RNC1 in which the
first MS resides assigns a foreign agent care-of address FA1 to the MS
as its first agent address, RNC2 in which the second MS resides
assigns a foreign agent care-of address FA2 to the MS as its first agent
address; when the two RCUs start a voice call, corresponding MG
assigns a temporary home agent address HA1 to the first MS as its
10 second agent address, and at the same time assigns a temporary home
agent address HA2 to the second MS as its second agent address; IP
encapsulation is performed on the uplink data packets from the first
MS to the second MS by means of inner and outer IP headers, wherein
the source and destination addresses of outer IP header of the data
15 packets are HA1 and FA2, respectively, and the source and
destination addresses of inner IP header of the data packet are HA1
and HA2, respectively; and IP encapsulation is performed on the
uplink data packets from the second MS to the first MS, wherein the
source and destination addresses of outer IP header of the packet are
20 HA2 and FA1, respectively, and the source and destination addresses
of inner IP header of the data packets are HA2 and HA1, respectively.

6. The method according to claims 1 or 2, wherein when the
mobile RCU in said RCUs registers with another RNC' which is
25 different from the RNC in which said mobile RCU currently resides
during the process of the voice call, said method further comprises the
following steps:

E) the another RNC' assigning a new foreign agent care-of
address FA' to said mobile RCU as its first agent address while

its second agent address remains unchanged;

F) the VoIP data packets being transmitted between the two RCUs in accordance with the new foreign agent care-of address FA'.

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7. A wireless communication system employing an all-IP architecture, comprising Core Network (CN) consisting of Mobile switch center MSC and Gateway Mobile Switch Center (GMSC), Radio Network Subsystem (RNS) consisting of a plurality of Radio
10 Network Controllers (RNCs), and a plurality of RCUs, characterized in that said system further comprising:

means for assigning a first agent address FA to a corresponding mobile RCU when a first RCU is about to initiate voice call with a second RCU;

15 means for assigning a second agent address HA1 to the first RCU and assigning a second agent address HA2 to the second RCU when the first RCU requests to talk to the second RCU, wherein both HA1 and HA2 are only valid during this call, and when the call is terminated or dropped, said HA1 and HA2 are released back to the
20 pool of the IP addresses of corresponding MG;

means for carrying out appropriate resource set-up for corresponding MG and the RNC in which the first and second RCUs reside;

means for transmitting VoIP data packets between the RNC of
25 said two RCUs or corresponding MG according to said first agent address FA, said second agent addresses HA1 and HA2, thereby implementing voice call between said two RCUs .

8. The wireless communication system according to Claim 7,

further comprising means for performing IP encapsulation for the transmitted VoIP data packets according to said first agent address FA and said second agent addresses HA1 and HA2, so that tunnels for transmitting said data packets can be established in foreign agents,
5 avoiding need of transmitting an outer IP header in the radio section.

9. A wireless communication system according to Claims 7 or 8, further comprising means for assigning the second agent address HA1 to the first RCU and assigning the second agent address HA2 to the
10 second RCU in accordance with IP address distribution status in the pool of the IP addresses of corresponding MG, wherein the assigned IP addresses can be re-assigned to other RCUs only after being released, and the IP addresses in the MG at different locations are different from each other.

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10. The wireless communication system according to Claims 7 or 8, wherein said first RCU is a MS and said second RCU is a PSTN phone, and the RNC in which the MS resides assigns a foreign agent address FA1 to the MS as its first agent address; when the two RCUs
20 start a voice call, the PSTN MG assigns to the MS a temporary home agent address HA1 as its second agent address, and at the same time assigns a temporary IP address HA2 to the PSTN phone as its second agent address; IP encapsulation is performed on the data packets carrying voices from PSTN MG to RNC in which the MS resides by
25 means of inner and outer IP headers, wherein the source and destination addresses of the outer IP header of the data packet are HA2 and FA1, respectively, and the source and destination addresses of the inner IP header of the data packets are HA2 and HA1, respectively.

11. The wireless communication system according to Claims 7 or 8, wherein said first RCU is a first MS, and said second RCU is a second MS; RNC1 in which the first MS resides assigns a foreign agent care-of address FA1 to the MS as its first agent address, and
5 agent care-of address FA1 to the MS as its first agent address, and RNC2 in which the second MS resides assigns a foreign agent care-of address FA2 to the MS as its first agent address; when the two RCUs start a voice call, corresponding MG assigns a temporary home agent address HA1 to the first MS as its second agent address, and at the
10 same time assigns a temporary home agent address HA2 to the second MS as its second agent address; IP encapsulation is performed on the uplink packets from the first MS to the second MS by means of inner and outer IP headers, wherein the source and destination addresses of the outer IP header of the data packets are HA1 and FA2, respectively, and the source and destination addresses of the inner IP
15 header of the data packets are HA1 and HA2, respectively; and, IP encapsulation is performed on the uplink packets from the second MS to the first MS, wherein the source and destination addresses of the outer IP header of the packet are HA2 and FA1, respectively, and the
20 source and destination addresses of the inner IP header of the packet are HA2 and HA1, respectively.

12. The wireless communication system according to Claims 7 or 8, wherein when the mobile RCU in said RCUs registers with another
25 RNC' which is different from the RNC in which said mobile RCU currently resides during the process of the voice call, the another RNC' assigns a new foreign agent care-of address FA' to said mobile RCU as its first agent address while its second agent address remains unchanged, and the VoIP data packets are transmitted between the two

RCUs according to the new foreign agent care-of address FA'.